

WHAT IS CLAIMED IS:

1. An implantable fixation rod, comprising:
a first segment, having a proximal end and a distal end;
a second segment, having a proximal end and a distal end; and
a joint between the first segment and the second segment;
wherein the joint is convertible between a first state in which the first and second segments are movable with respect to each other, and a second state in which the first and second segments are fixed with respect to each other.
2. An implantable fixation rod as in Claim 1, wherein the joint is convertible from the first state to the second state in response to lateral external compression.
3. An implantable fixation rod as in Claim 1, further comprising a third segment, movably connected to the second segment by a second joint.
4. An implantable fixation rod as in Claim 1, wherein in the second state the fixation rod will exhibit a static compression within the range of from about 120 to about 200 lbs.
5. An implantable fixation rod as in Claim 1, wherein in the second state the fixation rod will exhibit a static compression within the range of from about 30 to about 100 lbs.
6. An implantable fixation rod as in Claim 1, wherein the joint is configured such that the longitudinal axes of the first and second segments may be angularly adjusted up to 7.5 degrees with respect to each other.
7. An implantable fixation rod as in Claim 1, wherein the joint is configured such that the longitudinal axes of the first and second segments may be angularly adjusted up to 15 degrees with respect to each other.
8. An implantable fixation rod as in Claim 1, wherein the joint is configured such that the longitudinal axes of the first and second segments may be angularly adjusted up to 45 degrees with respect to each other.
9. A prosthesis assembly for minimally invasive posterior fixation, comprising:
a linkage rod, having a proximal end and a distal end, and releasable coupling on the proximal end, the linkage rod comprising at least a first segment and a second

segment coupled together at a joint configured such that the first segment and the second segment can be positioned at a variety of angular orientations with respect to each other; and

a bone anchor provided with an opening through which at least a portion of said linkage rod may extend and a lock configured to fix the angular orientation between the first segment and the second segment.

10. The prosthesis assembly of Claim 9, wherein the linkage rod comprises a third segment coupled to the second segment by a second joint configured such that the third segment and the second segment can be positioned at a variety of angular orientations with respect to each other.

11. The prosthesis assembly of Claim 10, comprising a second bone anchor also provided with an opening through which at least a portion of said linkage rod may extend and a lock configured to securely engage said linkage rod and fix the angular orientation between the third segment and the second segment.

12. The prosthesis assembly of Claim 9, wherein the bone anchor comprises a head in which said opening is formed and said lock comprises a rotatable connector disposed within said head, said rotatable connector adapted to securely engage said linkage rod and fix the angular orientation between the first segment and the second segment.

13. A prosthesis for minimally invasive posterior fixation, comprising:

a bone anchor having a head;

a transverse portal extending through said head along an axis transverse to a central axis of said bone anchor;

a first segment of a rod extending through said transverse portal, said first segment defining a first surface;

a second segment of a rod having a second complementary surface;

a joint formed at least in part by said first surface and said second surface; and

a locking cap which in response to lateral movement secures said first segment within said portal and fixes the angular relationship of the joint.

14. The prosthesis of Claim 13, wherein said first segment further comprises at least one compression gap.

15. The prosthesis of Claim 13, wherein said rod is adapted to be detachably secured to an insertion tool used to insert said rod into said portal.

16. The prosthesis of Claim 13, wherein further comprising a third segment of a rod, said third segment defining a socket for receiving a ball positioned on said second segment.

17. The prosthesis of Claim 16, further comprising a second bone anchor having a head, a transverse portal and a locking cap which in response to lateral movement secures said third segment within the portal of the second bone anchor and fixes the angular relationship between the third and second segments.

18. The prosthesis assembly of Claim 17, wherein the third segment is configured to be secured to an insertion tool used to insert said rod into said portals of said bone anchors.

19. A method of treating the spine, comprising the steps of:

securing a first bone anchor to a first vertebral body;

securing a second bone anchor to a second vertebral body;

positioning an articulating connector between the first and second bone anchors; and

transforming the connector from a flexible configuration to a rigid configuration to secure the first bone anchor to the second bone anchor.

20. A method of treating the spine as in Claim 19, wherein the first bone anchor is positioned in the sacrum, the second bone anchor is positioned in the L5 vertebrae.

21. A method of treating the spine as in Claim 19, wherein the securing a first bone anchor step comprises advancing a threaded bone screw into the first vertebral body.

22. A method of treating the spine as in Claim 19, wherein the positioning an articulating connector step comprises advancing the articulating connector through an aperture in at least one of the first and second bone screws.

23. A method of treating the spine as in Claim 22, wherein the positioning an articulating connector step comprises advancing the articulating connector through an aperture in each of the first and second bone screws.

24. A method of treating the spine as in Claim 19, wherein the positioning an articulating connector step comprises advancing the articulating connector percutaneously through tissue.

25. A method of treating the spine as in Claim 19, wherein the transforming step comprises locking at least one pivotable joint on the connector.

26. A method of treating the spine as in Claim 25, wherein the transforming step comprises manipulating a portion on the bone anchor to transform the connector.

27. A method of treating the spine as in Claim 26, wherein the transforming step comprises rotating a threaded shaft on the bone anchor to apply compression to the connector.

28. A method for minimally invasive posterior fixation, comprising:

securing a bone anchor to a vertebral body, said bone anchor being provided with an opening and a locking device;

inserting a rod with at least one angularly adjustable joint between a first segment of the rod and a second segment of the rod over a guidewire along a path through said opening connector; and

adjusting said locking device to fix an angular position between said first segment and said second segment.

29. The method of Claim 28 further comprising:

securing a second bone anchor to a second vertebral body, said second bone anchor provided with a second locking device;

inserting said rod through said second bone anchor; and

securing said second locking device to fix said rod with respect to said second bone anchor and to fix a second angularly adjustable joint which exists between a third segment and a second segment of said rod.

30. The method of Claim 28, wherein said first vertebral body and said second vertebral body are adjacent vertebral bodies.

31. The method of Claim 28, wherein said first vertebral body and said second vertebral body are separated by one or more other vertebral bodies.

32. A method of implanting spinal fusion hardware, comprising the steps of:

positioning a first bone anchor, having a first aperture, in a first vertebral body;

positioning a second bone anchor, having a second aperture, in a second vertebral body;

advancing a guide wire through the first and second apertures to form a non-linear path; and

advancing a fixation rod having at least one angularly adjustable joint along the non-linear path defined by the guidewire and through the first and second apertures.

33. A method of implanting spinal fusion hardware as in Claim 32, wherein the first and second vertebral bodies are adjacent vertebral bodies.

34. A method of implanting spinal fusion hardware as in Claim 32, wherein the first and second vertebral bodies are separated by a third vertebral body.

35. A method of implanting spinal fusion hardware as in Claim 32, additionally comprising the step of advancing a guide tube along the guide wire and through the first and second apertures.

36. A method of implanting spinal fusion hardware as in Claim 35, additionally comprising the step of advancing the fixation device through the guide tube.

37. A method of implanting spinal fusion hardware, comprising the steps of:

positioning a first bone anchor, having a first aperture, in a first vertebral body;

positioning a second bone anchor, having a second aperture, in a second vertebral body;

mounting an alignment tool to at least one bone anchor, the alignment tool comprising a curved guide needle;

advancing a guide wire through the first and second apertures using the alignment tool; and

advancing a segmented fixation rod along the guidewire and through the first and second apertures.

38. A method of implanting spinal fusion hardware as in Claim 37, wherein at least a portion of the alignment tool is mounted to the bone anchor before the positioning a bone anchor step.

39. A method of implanting spinal fusion hardware as in Claim 37, wherein the first and second vertebral bodies are adjacent vertebral bodies.

40. A method of implanting spinal fusion hardware as in Claim 37, wherein the first and second vertebral bodies are separated by a third vertebral body.

41. A method of implanting spinal fusion hardware as in Claim 37, wherein the mounting an alignment tool comprises mounting a central arm on the bone anchor, the central arm pivotably attached to a radial arm, and the guide needle is carried by the radial arm.

42. A method of implanting spinal fusion hardware as in Claim 41, wherein the guide needle has a radius of curvature within the range of from about 6cm to about 15cm.

43. A method of implanting spinal fusion hardware as in Claim 37, additionally comprising the step of manipulating a component of a bone anchor to lock the fixation rod.

44. A method of implanting spinal fusion hardware as in Claim 37, additionally comprising the step of advancing a guide tube along the guide wire and through the first and second apertures.

45. A method of implanting spinal fusion hardware as in Claim 44, additionally comprising the step of advancing the fixation rod through the guide tube.